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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/651,648	08/29/2003	Juan Manuel Tejjido	450117-04466	9331
7590 07/05/2005 FROMMER LAWRENCE & HAUG LLP 745 FIFTH AVENUE NEW YORK, NY 10151			EXAMINER CHANG, AUDREY Y	
			ART UNIT 2872	PAPER NUMBER

DATE MAILED: 07/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/651,648

Applicant(s)

TEIJIDO ET AL.

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on **April 26, 2005** has been entered.
2. This Office Action is also in response to applicant's amendment filed on April 26, 2005, which has been entered into the file.
3. By this amendment, the applicant has canceled claims 1-19 and has newly added claims 20-30.
4. Claims 20-30 remain pending in this application.
5. The objections and rejections of claims 1-19 under 35 USC 112, first paragraph, set forth in the previous Office Action are withdrawn in response to applicant's amendment.

Drawings

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "*sequence of embedded material portions so as to from grating line elements*" recited in **claim 23**, the "said convex protrusions, said concave recesses **and** said embedded portions" recited in **claims 24 and 25**, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a

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drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The same objections to the drawings concerning "embedded portions" have been set forth in the previous Office Action however the applicant fails to respond such objections.

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "21e". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Response to Amendment

8. The amendment filed on **April 26, 2005** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **the newly added claim 27** recites the grating bulk material comprises “a *plurality* of layers” and **the newly added claim 29** recites “said dichroic multilayer structure and said first and second layer materials thereof *extended* in a plane”. The specification **fails** to teach that the grating bulk material comprises a plurality of layers. The specification also **fails** to teach how could the dichroic structure and the layer materials are capable of extending in a plane and *yet* still form the diffractive grating structure. The applicant is mistaken with the disclosure in Figure 4, which is a **prior art system**.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. **Claims 27 and 29 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on the newly added matters are set forth in the paragraph above.

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11. **Claim 29 is rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification fails to teach how could the dichroic structure and the first and second material layers being *extended* in a plane yet still forms the diffractive grating structure, (please see Figure 1). The applicant is respectfully noted that specification only teaches that the multilayer structure of alternatively arranged first and second materials forms regular array of convex protrusions and concave recesses that serves as the diffractive grating structure. If the layers are extended in a plane then no such protrusions and recesses will be result and no diffractive grating structure will be formed.

Claim Objections

12. **Claims 20-30 are objected to because of the following informalities:**

The claims are generally *narrative* and *indefinite*, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with **grammatical and idiomatic errors**.

(1). The claims are *incomplete* since the following structural relationships are lacking. It is not clear how dose the “*multilayer dichroic structure*” relate to the following *elements*: “grating bulk material”, “the concave and convex protrusions”, “concave recesses” and “the sequence of embedded material portions”. This makes the **scopes** of the claims reciting these *elements* very unclear and indefinite. These elements do not seem to have any meanings in the illumination unit. **Clarifications in the claims are required**.

(2). The phrase “a sequence of embedded material portions” recited in claim 23 is very confusing and indefinite since it is not clear what is this.

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(3). The phrase “said convex protrusions, said concave recesses **and** said embedded material portions” recited in claims 24 and 25 are confusing and indefinite since the specification fails to give a *positive structure disclosure* of the diffractive grating structure having the protrusions, the recesses **and** *embedded* material portions. It is therefore not clear what are these “embedded material portions” and how do they relate to the diffractive grating structure.

(4). The phrase “*said* embedded materials” recited in claims 24-26 is confusing and indefinite since it *lacks proper antecedent basis* from their based claim.

(5). The phrase “said concave recesses” recited in claims 24 and 25 is confusing and indefinite since it lacks proper antecedent basis from their respective based claim.

(9). The phrase “substrate bulk material comprises a *plurality* of layers” as recited in claim 27 is confusing and indefinite since it is not clear a plurality of layers of what is referred here.

The claims as stand now contain numerous errors, indefiniteness and confusions. The examiner can only point out a few. It is applicant’s responsibility to clarify ALL of the discrepancies in the claims to make them in comply with the requirements of 35 USC 112.

The applicant is respectfully requested to respond and to make appropriate amendments to clarify these discrepancies.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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14. Claims 20-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Kaise et al (PN. 6,330,112) in view of the patent issued to Takada et al (PN. 6,822,796).

Kaise et al teaches an *illumination unit* in an *image projection display apparatus* (Figure 1) wherein the illumination unit comprises a light source, serves as the *primary illumination light providing portion*, (11, Figure 1) that is adapted to provide a *primary illumination light* and a *projection lens* (70) serves as the *secondary illumination light providing portion* for providing a *secondary illumination light, for external use*, that is *derived* from the primary illumination light. Kaise et al teaches that a *polarization beam splitter* (17) and *dichroic mirrors* (66), **together** serves as the *light selecting element*, is disposed between the primary illumination light providing portion (11) and the second illumination light providing portion, (70) for *reflecting* S-polarization component of the incident light and for *transmitting* the P-polarized component of the incident light and for *selecting* and separating *particular color* or *spectral component* of incident light, (please see columns 5 and 10).

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the light selecting element comprises a dichroic multilayer structure serves as a dichroic spectral filter and the dichroic multilayer structure forms a part of diffractive grating structure. This reference also does not teach explicitly that the light selecting element is formed of a single optical unit.

Takada et al in the same field of endeavor teaches a **diffractive grating structure having a dichroic multilayer structure**, (please see Figures 1-4, 13 or 53), that is capable of *reflecting* light of a *selected wavelength* (or color) and *transmitting* light of the other wavelengths (i.e. having wavelength *selectivity* and *dichroic beam splitting and filtering function*), (please see column 2, lines 22-32, column 5, lines 45-50). Takada et al **further teaches** that the *diffractive grating structure* with the *dichroic multilayer structure* also has *polarization selectivity*, namely the multilayer film is capable of *reflecting* s-polarized light and *transmitting* p-polarized light, (please see column 1, lines 50-59 and column 2, lines 28-32). Takada et al **teaches explicitly** that the dichroic multilayer structure having *alternating layers of*

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first and second materials (13a and 13b or 53a and 53b, in Figures 1-4, refractive index of n_1 and n_2), and the layer thickness is designed to have a **quarter** of the **wavelength** intended to be filtered by the dichroic multilayer structure, (please see Figure 1, columns 3, 5 and 6). According to the theory of interference filter, this thickness of the layers in the multilayer structure, (i.e. a quarter of desired wavelength), will ensure the filter reflects the light having this particular wavelength and transmits light of other wavelengths, (please see column 5, lines 45-50). This means the S-polarization component of the light with the *desired* wavelength will be reflected by the diffractive grating structure and the light of other polarization and S-polarization component of the light with wavelength *other than* the designed wavelength will be transmitted, (as the result of the *inherent properties* of the multilayer structure).

The structures concerning the protrusions, recesses and the embedded portions recited in the various claim are very confusing for the reasons stated above. They can therefore only be examined in the broadest interpretations as follows.

Takada et al further teaches that the diffractive grating structure has a *grating bulk material* (11, Figures 1-3) and alternative sequence of *concave* recesses and *convex protrusions* in the first surface of the bulk material and *a plurality of multilayer films* (13a and 13b), which serves as the *dichroic multilayer structure*, also with alternative sequence of concave recesses and convex protrusions (12). In Figure 3, Takada et al teaches that the diffractive grating structure has *line structure* and the multilayer structure (12, Figure 3) serves as the *embedded* material that fill the concave areas of the grating bulk material. The diffractive grating structure also can be viewed as embedded in the ambient air with the ambient air filling the recesses. The refractive indices of the bulk material, the multilayer structure and ambient air are all different, (please see column 6, lines 34-40). With regard to claim 27, one can regard the multilayer structure as the grating bulk materials. It would then have been obvious to one skilled in the art to apply the teachings of Takada et al to modify the light selecting element, including both the polarization beam splitter and the dichroic spectral reflective filter (or dichroic mirror) of Kaise et al to

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make them into a *single* diffractive grating structure with dichroic multilayer structure for the benefit of using one single diffractive grating element to achieve both the wavelength selective and polarization selective property to reduce the size of the system.

15. Claims 20-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Kaise et al (PN. 6,330,112) in view of the patent issued to Kurtz et al (PN. 6,532,111).

Kaise et al teaches an *illumination unit* in an *image projection display apparatus* (Figure 1) wherein the illumination unit comprises a light source, serves as the *primary illumination light providing portion*, (11, Figure 1) that is adapted to provide a *primary illumination light* and a *projection lens* (70) serves as the *secondary illumination light providing portion* for providing a *secondary illumination light, for external use*, that is *derived* from the primary illumination light. Kaise et al teaches that a *polarization beam splitter* (17) and *dichroic mirrors* (66), **together** serves as the *light selecting element*, is disposed between the primary illumination light providing portion (11) and the second illumination light providing portion, (70) for *reflecting* S-polarization component of the incident light and for *transmitting* the P-polarized component of the incident light and for *selecting* and separating *particular color* or *spectral component* of incident light, (please see columns 5 and 10).

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the light selecting element comprises a dichroic multilayer structure serves as a dichroic spectral filter and the dichroic multilayer structure forms a part of diffractive grating structure. This reference also does not teach explicitly that the light selecting element is formed of a single optical unit.

Kurtz et al in the same field of endeavor teaches a *wire grid polarizer* (300, Figures 5a-5d) having *dichroic multilayer structure* having *alternatively* arranged layers (322, 324, Figure 5a, 5c-5d or 330, 350 Figure 5b) with these arranged layers form as part of a diffractive grating structure wherein the wire grid polarizer is designed to *reflect s-polarization component* of the light and to *transmit p-*

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polarization component of the light, (please see column 9, lines 48-65 and column 10). Kurtz et al further teaches that the wire grid with dichroic multilayer structure is capable of filtering (i.e. *reflecting*) *particular color of light* (i.e. *blue* light spectrum, please see Figures 7c and 7d and column 12, lines 30-54). As shown in Figures 7c and 7d, the wire grid polarizer reflects *s-polarization* of *blue* spectrum and transmits light of other polarization and other wavelengths.

With regard to claims 21-30, the structures concerning the protrusions, recesses and the embedded portions recited in the various claim are very confusing for the reasons stated above. They can therefore only be examined in the broadest interpretations as follows.

Kurtz et al teaches the wire grid polarizer has bulk *substrate* material, (305, Figures 5a-5d), and having a plurality of convex protrusions (the areas of the alternatively arranged layers 322, 324 or 330, 350) and concave recesses (regions between the alternatively arranged layers). The wire grid polarizer can be viewed as *embedded* in an ambient air with the ambient air being the *filling materials* and therefore formed the *sequence* of the embedded material portions (i.e. air portions). The refractive indices of the first and second materials of the multilayer structure, the ambient air and the substrate bulk materials are implicitly all different in order for the diffraction and interference filter effect to take place.

It would then have been obvious to one skilled in the art to apply the teachings of Kurtz et al to modify the light selecting element, including both the polarization beam splitter and the dichroic spectral reflective filter (or dichroic mirror) of Kaise et al to make them into a *single* diffractive grating structure with dichroic multilayer structure for the benefit of using one single diffractive grating element to achieve both the wavelength selective and polarization selective property to reduce the size of the system.

Response to Arguments

16. Applicant's arguments filed on April 26, 2005 have been fully considered but they are not persuasive. The newly submitted claims have been fully considered and they are rejected for the reasons stated above.

17. In response to applicant's arguments which states that the color selective of s-polarized light is not disclosed in the cited Takada reference, the examiner respectfully disagrees and wishes to point out to applicant that Takada reference teaches *specifically* to reflect S-polarization light and the quarter *wavelength* thickness design of the layers in the multilayer structure will have to reflect light of the particular design wavelength (used to design the thickness of the layers) as stated explicitly in column 5, lines 45-50.

18. The applicant is respectfully requested to *respond* to the objections to the drawings and claims as stated in the previous and subsequently this Office Action.

Contact Information

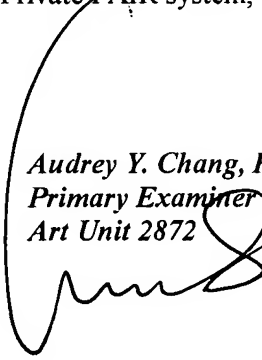
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.